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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

YUN, JURIE

ART UNIT	PAPER NUMBER
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2882

DATE MAILED: 11/29/2002

14

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/731,866

Applicant(s)

NAGANO ET AL.

Examiner

Jurie Yun

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/24/02.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5 and 7-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Epstein et al. (USPN 5,858,561) and further in view of Nomura et al. (USPN 5,335,139).
3. With respect to claim 1, Epstein et al. disclose an EL device comprising a first electrode (Fig. 1, 18), a first insulator layer (14), a light emitting layer (12), a second insulator layer (16) and a second electrode layer (22) successively stacked on an electrical insulating substrate (28).

Epstein et al. do not disclose at least one of said first insulator layer and said second insulator layer comprises barium titanate, magnesium oxide, manganese oxide, at least one oxide selected from barium oxide and calcium oxide, silicon oxide, and optionally yttrium oxide, wherein the amount of magnesium oxide, manganese oxide, yttrium oxide, barium oxide, calcium oxide and silicon oxide with respect to 100 moles of barium titanate is:

MgO:	0.1 to 3 moles,
MnO:	0.05 to 1.0 mole,
Y ₂ O ₃ :	1 mole or less,

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BaO + CaO: 2 to 12 moles, and

SiO₂: 2 to 12 moles.

Nomura et al. disclose this (Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Epstein et al. invention and disclose at least one of the first insulator layer and the second insulator layer comprises the components given above, as taught by Nomura et al. As disclosed by Nomura et al. (column 1, lines 37-46), "When the dielectric material is subject to DC electric field, there arises another problem that its relative dielectric constant lowers with time. If thinner dielectric layers are used in order to provide chip capacitors of a smaller size and greater capacitance, application of DC voltage across the capacitor causes the dielectric layers to receive a more intense electric field, resulting in a more remarkable change of dielectric constant with time, that is, a more remarkable change of capacitance with time." This would benefit the insulator layer(s) in the Epstein et al. invention, since it uses DC voltage.

4. With respect to claim 2, Epstein et al. disclose the electrical insulating substrate (column 7, lines 18-26) and the first insulator layer (column 6, lines 24-27) are each formed of a ceramic material.

5. With respect to claim 3, Epstein et al. do not disclose BaO, CaO and SiO₂ are present in at least one of the first and second insulator layers in the form of (Ba_xCa_{1-x}O)_y.SiO₂ where $0.3 \leq x \leq 0.7$ and $0.95 \leq y \leq 1.05$ and in an amount of 1 to 10% by weight with respect to the sum of the weights of BaTiO₃, MgO, MnO and Y₂O₃. Nomura et al. disclose this (column 4, lines 11-35). It would have been obvious to one of

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ordinary skill in the art at the time the invention was made to modify the Epstein et al. invention and disclose BaO, CaO and SiO₂ are present in at least one of the first and second insulator layers in the form of (Ba_xCa_{1-x}O)_y.SiO₂ where $0.3 \leq x \leq 0.7$ and $0.95 \leq y \leq 1.05$ and in an amount of 1 to 10% by weight with respect to the sum of the weights of BaTiO₃, MgO, MnO and Y₂O₃, as taught by Nomura et al. As disclosed by Nomura et al. (column 4, lines 15-16), this would ensure the sintered body would be dense.

6. With respect to claims 4 and 5, Epstein et al. disclose the first electrode comprises one or two or more of Ni, Ag, Au, Pd, Pt, Cu, W, Fe, and Co or any one of Ag-Pd, Ni-Mn, Ni-Cr, Ni-Co and Ni-Al alloys (column 6, lines 56+).

7. With respect to claim 7, Epstein et al. disclose the light emitting layer has a thickness of 100 to 1000 nm (column 8, lines 11-14).

8. With respect to claim 8, Epstein et al. disclose the second electrode comprises at least one material selected from the group consisting of tin-doped indium oxide, zinc-doped indium oxide, indium oxide, tin oxide, and zinc oxide (column 6, lines 56+).

9. With respect to claim 9, Epstein et al. do not disclose the amount of MgO relative to 100 moles of barium titanate is 0.5 to 1.5 moles. Nomura et al. disclose this (column 4, line 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Epstein et al. invention and disclose the amount of MgO relative to 100 moles of barium titanate is 0.5 to 1.5 moles, as taught by Nomura et al. Nomura et al. disclose that this is the preferred amount (column 4, line 3). This

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would benefit the insulator layer(s) in the Epstein et al. invention, since it uses DC voltage.

10. With respect to claim 10, Epstein et al. do not disclose the amount of MnO relative to 100 moles of barium titanate is 0.2 to 0.4 moles. Nomura et al. disclose this (column 4, line 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Epstein et al. invention and disclose the amount of MnO relative to 100 moles of barium titanate is 0.2 to 0.4 moles, as taught by Nomura et al. Nomura et al. disclose that this is the preferred amount (column 4, line 4). This would benefit the insulator layer(s) in the Epstein et al. invention, since it uses DC voltage.

11. With respect to claim 11, Epstein et al. do not disclose the ratio $(\text{BaO} + \text{CaO})/\text{SiO}_2$ is in the range of 0.9 to 1.1. Nomura et al. disclose this (column 4, lines 11-12). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Epstein et al. invention and disclose the ratio $(\text{BaO} + \text{CaO})/\text{SiO}_2$ is in the range of 0.9 to 1.1, as taught by Nomura et al. Nomura et al. disclose this exact range and the fact that this is a typical range (column 4, lines 11-12).

12. With respect to claim 12, Epstein et al. do not disclose the amount of yttrium oxide is in the range of 0.1 to 1 moles relative to 100 moles of barium titanate. Nomura et al. disclose this (column 4, lines 24-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Epstein et al. invention and disclose the amount of yttrium oxide is in the range of 0.1 to 1 moles relative to 100 moles of barium titanate, as taught by Nomura et al. As disclosed by

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Nomura et al. (column 4, lines 24-30), it is preferred to have at least 0.1 mole as the lower limit in order for the yttrium oxide to exert its effect.

13. With respect to claim 13, Epstein et al. do not disclose the first insulator layer has an average crystal grain diameter of 0.2 to 0.7 μm . Nomura et al. disclose this (column 6, lines 15-18). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Epstein et al. invention and disclose the first insulator layer has an average crystal grain diameter of 0.2 to 0.7 μm , as taught by Nomura et al. As disclosed by Nomura et al. (column 6, lines 15-18), this is typical when using the specific compositions used.

14. With respect to claim 14, Epstein et al. disclose the first electrode comprises a material selected from the group consisting of Ag, Pd, and Ag-Pd alloys (column 6, lines 56+).

15. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Epstein et al. (USPN 5,858,561) and Nomura et al. (USPN 5,335,139) as applied to claim 1 above, and further in view of Chen (USPN 6,008,578).

16. With respect to claim 6, Epstein et al. and Nomura et al. do not disclose the light emitting layer comprises at least one material selected from the group consisting of ZnS, Mn/CdSSe, ZnS:TbOF, ZnS:Tb, SrS:Ce, (SrS:Ce/ZnS)_n, CaGa₂S₄:Ce, and SrS:Ce/ZnS:Mn. Chen discloses this (column 3, lines 14-43). It would have been obvious to one of ordinary skill in the art to further modify the Epstein et al. and Nomura et al. inventions and disclose the light emitting layer comprises at least one material selected from the group consisting of ZnS, Mn/CdSSe, ZnS:TbOF, ZnS:Tb, SrS:Ce,

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(SrS:Ce/ZnS)_n, CaGa₂S₄:Ce, and SrS:Ce/ZnS:Mn, as taught by Chen. As disclosed by Chen (column 3, lines 29-34), "As for the fluorescent material, both inorganic materials as ZnS, or organic materials may be used. As for the fluorescent material which can be excited by lights having wave length between 380-400 nm reliably emitable of visible R, G, B three lights, it may be easier to select from inorganic materials than from organic ones, such as ..."

17. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Epstein et al. (USPN 5,858,561) and Nomura et al. (USPN 5,335,139) as applied to claim 1 above, and further in view of Arai et al. (USPN 6,399,222 B2).

18. With respect to claim 15, Epstein et al. and Nomura et al. do not disclose the substrate comprises Al₂O₃ and optionally one or more oxides selected from the group consisting of SiO₂, MgO, and CaO. Arai et al. disclose this (column 13, lines 30-32). It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the Epstein et al. and Nomura et al. inventions and disclose the substrate comprises Al₂O₃ and optionally one or more oxides selected from the group consisting of SiO₂, MgO, and CaO, as taught by Arai et al. This combination results in a strong enough and cost efficient substrate.

Response to Arguments

19. Applicant's arguments filed 10/24/02 have been fully considered but they are not persuasive. Applicants believe that the replacement of the Epstein et al. insulator layers with the insulator layer composition disclosed by Nomura et al. would not provide for a reasonable expectation of success; that the organic light emitting layer of the device of

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Epstein would be destroyed by the firing temperature needed to prepare the Nomura et al. insulator layer. However, the insulator layers could be prepared separate from the organic light emitting layer. Applicants also state that Epstein et al. fail to disclose an electroluminescent layer composed of an inorganic material. However, this is not claimed in claim 1. Furthermore, the rejection for claim 6 above shows that EL devices can use inorganic materials in an organic binder.

20. The objections to the Abstract and to claims 4 and 5 have been withdrawn in response to the amendment.

Conclusion

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jurie Yun whose telephone number is 703 308-3535.

The examiner can normally be reached on Monday-Friday 8:30-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 703 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are 703 308-7722 for regular communications and 703 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0956.

Jurie Yun
November 26, 2002


ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
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